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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,810	04/27/2001	Ismaeil R. Ismaeil	U0600 0002 GNM/sks	2805

720 7590 09/09/2004

OYEN, WIGGS, GREEN & MUTALA
480 - THE STATION
601 WEST CORDOVA STREET
VANCOUVER, BC V6B 1G1
CANADA

EXAMINER	
DIEP, NHON THANH	

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/842,810	ISMAEIL ET AL.	
	Examiner	Art Unit	
	Nhon T Diep	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) *20-24 and 30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11,17-19 and 25-29* is/are rejected.

7)☒ Claim(s) *12-16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/27/2001*.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Gavin N. manning on 23 June 2004.

IN THE CLAIMS:

Claim 16: Line 1, after "The method of", "any one of claims 1 to 15" has been changed to --claim 15--.

2. Applicant's election without traverse of claims 1-19 and 25-29 in the reply filed on 15 July 2004 is acknowledged. The examiner also wishes to stress that all claim numbers indicated throughout this office action are the new claim numbers (after being renumbered).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1-10, 19, 25 (formerly claim 26), 26 (formerly claim 27) and 28 (formerly claim 29) are rejected under 35 U.S.C. 102(e) as being anticipated by Sethuraman et al (US 6,434,196).

Sethuraman et al discloses a method and apparatus for encoding video information comprising the same method for obtaining an estimated motion vector for use in block-based video encoding, the method comprising: refining a predicted motion vector for a current block to obtain an estimated motion vector in a sequence (col. 7, ln. 56 – col. 8, ln. 3, col. 8, ln. 12-24, col. 20, ln. 28-54) comprising a plurality of steps; and, before each of a plurality of the steps of the sequence, computing a similarity value between the block and another block indicated by the current estimated motion vector (col. 4, ln. 7-12 and col. 28, ln. 10-15), comparing the similarity value to a threshold (col. 15, ln. 18-45), and not performing subsequent steps in the sequence if the comparison indicates that the current estimated motion vector provides a match between the current block and the another block which is better than a match corresponding to the threshold (col. 15, ln. 18-45, col. 28, ln. 10-15) as specified in claim 1, 19 (col. 35, ln. 59 – col. 36, ln. 11), 25 (formerly claim 26) and 28 (formerly claim 29); wherein the similarity measure

is a sum of absolute differences (col. 28, ln. 10-15) as specified in claims 2 and 4; obtaining the predicted motion vector by computing a similarity measure between the block and each of a plurality of other blocks indicated by prior estimated motion vectors previously computed for a plurality of previously encoded nearby blocks and using as the predicted motion vector one of thee prior estimated motion vectors for which the similarity measure indicates a best match for the current block (col. 39-50, col. 20, ln. 33-41, col. 22, ln. 30-43, col. 24, ln. 38-49) as specified in claims 3,10, 25 (formerly claim 26) and 28 (formerly claim 29); the plurality of nearby blocks comprise a block immediately to the left of the current block, a block immediately above the current block and a block above and to the right of the current block; wherein the plurality of nearby blocks comprise a block in the same position as the current block in an immediately preceding frame (as the search goes on in both horizontal and vertical direction of the search frame, in some instances, the search will include block with the same position in the previous frame) (col. 24, ln. 22-37, col. 29, ln. 65 – col. 30, ln. 10) as specified in claim 5 and 6; refining the predicted motion vector comprises performing one or more frame motion estimation steps followed by one or more field motion estimation steps (col. 30, ln. 50-52, col. 32, ln. 52 – col. 33, ln. 5); the frame motion estimation steps include or comprise a low resolution frame motion estimation step, a full pel frame motion estimation step and a half pel frame motion estimation step (col. 16, ln. 48-62, fig. 1, el. 150) as specified in claims 7-9; wherein the transformation step comprises performing a quantized discrete cosine transform operation (Fig. 1, el. 110-115) as specified in claim 26 (formerly claim 27).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 11, 17-18 and 27 (formerly claim 28).are rejected under 35 U.S.C. 103(a) as being unpatentable over Sethuraman et al (US 6,434,196).

As applied to claims 1 and 26 above, it is noted that Sethuraman et al does not particularly disclose that the frame motion estimation comprises a low resolution frame motion estimation and a full pel frame motion estimation step; wherein obtaining the estimated motion vector comprises a full pel motion estimation step followed by a half pel motion estimation step and the method comprises computing a first similarity value between a current block and another block indicated by the current estimated motion vector prior to the full pel motion estimation step comparing the first similarity value to a threshold, and, if the comparison indicates a match better than the threshold not carrying out either the full pel motion estimation step or the half pel motion estimation step; and computing a second similarity value between a current block and another block indicated by the current estimated motion vector after the full pel motion estimation step and prior to the half pel motion estimation step, comparing the second similarity value to a second threshold, and, if the comparison indicates a match better than the second threshold not carrying out the half pel motion estimation step as specified in claims 11, 17-18 and 27 (formerly claim 28).. Fig. 1, el 150 clearly shows

that full and half pel motion estimation are being carried out in the process and fig. 12 shows that the difference between current block and search block are compared to find a match (steps 1208 and 1210) and the process stops when a match is found (step 1214). It is further noted that Sethuraman et al also mentions:

a. The number of levels is generally limited by the size of the image and the downsampling factor selected to generate the next lower resolution image. Thus, the number of levels in the mean pyramid can be selected for a particular application and that motion is first estimated at the coarser level of the pyramid (where the range is much lower than the range at the finest, original resolution) and then propagated to the finer levels where the search is refined over a small window. Since the range is quite small at the finer resolutions (where there are more pixels and the matching error computation needs more calculations) a substantial reduction in the number of computations over full-search block matching at the finest level is realized;

b. Direct application of full search block matching is highly inefficient, and

c. The optional half pel motion vector HPMV and a half pel distortion signal HPD are depicted as being coupled to the mode decision module 105, where they are advantageously utilized to increase the accuracy of the mode decision.

Al though, Sethuraman et al does not clearly show when exactly to stop the process of full pel search and/or half pel search as specified in claims 17-18 but Sethuraman et al provide adequate motivation to stop a full pel search as indicated in fig. 12 or to have more than one thresholds to terminate the process since direct application of full search block matching is highly inefficient and that Sethuraman et al only considers half pel

search as an optional process and therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Sethuraman et al by obtaining the estimated motion vector comprises a low resolution frame motion estimation, a full pel motion estimation step followed by a half pel motion estimation step and the method comprises computing a first, second similarity value between a current block and another block indicated by the current estimated motion vector prior to the full pel motion estimation step comparing the first similarity value to a threshold, and, if the comparison indicates a match better than the threshold not carrying out either the full pel motion estimation step or the half pel motion estimation step; and computing a second similarity value between a current block and another block indicated by the current estimated motion vector after the full pel motion estimation step and prior to the half pel motion estimation step, comparing the second similarity value to a second threshold, and, if the comparison indicates a match better than the second threshold not carrying out the half pel motion estimation step. Doing so would help to efficiently obtain motion vector.

Allowable Subject Matter

6. Claims 12-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Rodriguez et al (US 6,195,389) discloses a motion estimation system and methods.

b. Koba et al (US 6,269,174) discloses an apparatus and method for fast motion estimation.

c. Chang et al (US 6,130,912) discloses a hierarchical motion estimation using block matching.

d. Harza et al (US 6,594,313) discloses an increased video playback framerate in low bit-rate video application.

e. Hsu (US 6,757,330) discloses an efficient implementation of half pixel motion prediction.

f. Kurak, Jr. et al (US 6,697,427) discloses methods and apparatus for improved motion estimation for video encoding.

g. Snook (US 6,654,420) discloses a video encoding method.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhon T Diep whose telephone number is 703-305-4648. The examiner can normally be reached on m-f.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris S Kelley can be reached on 703 305-4856. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ND
7 Sept 2004

NHON DIEP
PRIMARY EXAMINER